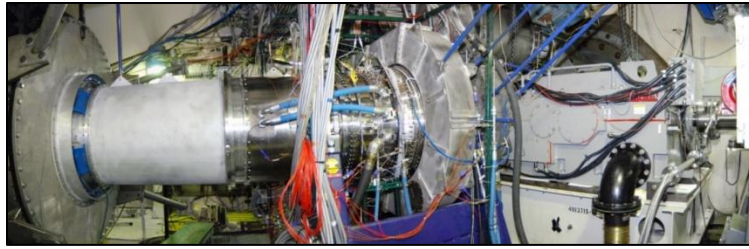


Compressor Research Facility (CRF)



Description:

The CRF conducts supports exploratory and advanced development efforts in compressor technology, independently evaluating full-scale, multi-stage, one or two-spool three-flow fans and compressors under operating conditions similar to actual flight profiles. It is used to determine the aerodynamic and aeromechanical performance of the most advanced compressors and fans in the world, while enhancing the understanding their complex internal flow physics. Using this research data, design techniques and CFD codes and models are verified and enhanced. It is automated and computer controlled to study steady-state and transient phenomena on full-size research

compressors. The facility can handle most compressors from operational engines and is used to update compressor performance maps.

The CRF's performance characteristics include:

Main Drive: Speed/power - 0 to 16,000 rpm at 30,000 HP; Speed/power - 0 to 30,000 rpm at 15,000 HP

Dual Drive: Speed/Power - 0 - 12,500 rpm at 8000 HP

Acceleration rate - 10%/second (facility speed)

Inlet pressure range - 2 psia to ambient

Inlet air flow rate - 0 - 500 lbm/sec

Inlet temperature capability, atmospheric to 500°F

Core Discharge conditions:

Pressure: Ambient to 40 psia; Flow: 0-500 lbm/sec; Temperature: Ambient to 1,490°F

Bypass Discharge conditions:

Pressure: 2-40 psia; Flow: 0-250 lbm/sec; Temperature: Ambient to 1,200°F

3rd Stream Discharge conditions:

Pressure: 2-40 psia; Flow: 0-125 lbm/sec; Temperature: Ambient to 700°F

Data Acquisition Channels: Digital (performance)

1150 Digital high-speed channels:

32 @ 1.2 MSPS/channel; 256 @ 0.256 MSPS/channel

Purpose:

Perform aerodynamic and aeromechanical research on full-scale, multi-stage, one or two spool exploratory and advanced development fans and compressors.

Products:

Multistage forward sweep technology for high performance fans and compressors

Advanced optical surface pressure and temperature measurement technology

Verification of advanced (national) computational fluid dynamics codes

Development of inlet flow field measurement standards for High Cycle Fatigue test and evaluation Unique test data sets of advanced fans and compressors developed under IHPTET

Availability:

Primarily in-house and related DoD contractor research. Other U.S. Government agency, DoD contractor and commercial customer programs upon request. Contact: 937-255-6802.